Physics 201: Waves and Optics

Fall 2012

http://www.ruf.rice.edu/~hafner/phys201.html

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Meets: MWF 9:00 – 9:50 in HZ 210
Texts: *Vibrations and Waves*, French
Introduction to Optics, Pedrotti[3]

Content: This course covers harmonic motion, waves in continua, electromagnetic waves, geometrical optics, and physical optics. Emphasis is on physical concepts and mathematical methods that are applicable to many areas of physics.

Homework, Exams, and Grades: There will be one homework problem set per week due at 5:00 pm on Wednesdays. The due dates are all given on the calendar at the class website listed above. Homework should be turned in to the Phys 201 drop box in Brockman Hall. Late homework will be penalized 10% per day late unless excused by illness or some other valid reason. Late homework should be turned in to the instructor. The homework problems are not pledged and may be solved in a collaborative manner, but your written solutions must not be directly copied from any source. The pledged exams will be open book, open note, timed take home exams due at 5:00 pm on the dates listed on the calendar. You may not collaborate with other students on the exams or use sources other than the class material. The final grades will be 40% homework, 30% for the midterm exam, and 30% for the final exam. There is no absence policy.

Discussions and Office Hours: BRK 200 has been reserved on Tuesdays from 2:00 pm to 5:00 pm for students to discuss the homework problems. The instructor will be available for discussions during that time, and will hold office hours by appointment.

Topics:

Continua	Electromagnetic Waves	Optics
Simple Harmonic Motion	Vector and Scalar Fields	Light at a Curved Interface
Real Oscillators	Maxwell's Equations	Plane Wave Interference
Superposition	EM Wave Equation	Young's Double Slit
Damped SHM	EM Plane Waves	Thin Film Interference
Driven SHM	Light	Interferometry
Resonance	Light in a Dielectric	Multiple Beam Interference
Coupled SHM	Polarization States	Lasers
Continua	Light at a Plane Interface	Fraunhofer Diffraction
Fourier Analysis	Manipulating Polarization	Diffraction from Apertures
Wave Motion	Huygens and Fresnel Principles	Multiple Slit Diffraction
Dispersion		Image Formation
Reflection, Transmission, and Absorption		Scattering

Students with Disabilities: Any student with a disability requiring accommodations in this course is encouraged to contact me after class or during office hours. Additionally, students will also need to contact Disability Support Services in the Ley Student Center.